NOTES

Recommendations of Pacific Science Conference, National Research Council

A NUMBER OF POLICIES for the co-ordinated development of scientific research in the Pacific were adopted by the Pacific Science Conference of the National Research Council, which met at the National Academy of Sciences, Washington, D. C., on June 6–8, 1946. More than one hundred members of the conference from various divisions met with a number of liaison members from the State Department, War Department, Army Air Forces, Navy Department, U. S. Coast Guard, Department of the Interior, Department of Agriculture, Department of Commerce, U. S. Commercial Company, U. S. Office of Education, U. S. Public Health Service, Smithsonian Institution, American Council of Learned Societies, American Council on Education, and Social Science Research Council. Special guests were invited from a number of foundations interested in Pacific research.

The general and specific recommendations adopted by the Council, given below, should be of interest to all persons and organizations concerned with the systematic and methodical advancement of scientific studies in this vast area.

GENERAL RECOMMENDATIONS

1. *Declassification*

   THAT this Conference strongly recommend that, insofar as practicable, all Pacific Island materials and information now the property of government agencies and organizations be declassified and made available to recognized scientific organizations in accordance with recommendations from the proposed Pacific Science Survey.

2. *Conservation*

   THAT throughout the Pacific area every effort be made:

   a. To protect and preserve areas, objects and living species of flora and fauna having scientific, historic, or aesthetic significance, through appropriate conservation legislation, including the establishment of national parks, nature monuments, and reserves.

   b. To take necessary measures to insure the preservation of flora and fauna in their native environment.

   c. To set aside certain wilderness areas that are to be maintained inviolate except for essential scientific studies.

   d. To determine which species are in danger of extinction and to take special measures for their protection and preservation.

   e. To avoid the deliberate introduction of exotics wherever indigenous fauna or flora will be endangered, and to keep records of the intentional and accidental introduction and spread of exotic forms of animal life.

   f. To minimize accidental introductions, by more effective quarantine efforts.

   g. To apply caution in the use of insecticides (such as DDT), rodenticides (such as 1080), herbicides, and other chemical controls of organisms, and to carry out thorough researches on the effects of such chemicals on all forms of life, including independent investigations before, during, and after the applications.

   THAT conservation regulations and the importance of protecting vanishing species from extinction be brought to the immediate attention of the establishments of the Armed Forces to prevent indiscriminate shooting or other practices that might cause the extinction of vanishing species of flora and fauna.

3. *Fellowships*

   THAT the continuing organization arrange for research fellowships at varying financial grades for competent graduate students, and for grants-in-aid to established scholars, including local inhabitants, in the several fields of science involved, as a part of the mechanics of staffing research.

   THAT funds be made available to foster the interchange of information on the physiology, biochemistry, and biophysics of plants of importance in the Pacific area, to allow personal contact in this field between workers of various nationalities, and to make possible the translation and publication of research results obtained during the war in former enemy and enemy-occupied territories.

4. *The Pacific Foundation War Memorial*

   THAT the Pacific Science Conference approve the concept of the Pacific Foundation: "Es-

tablished as a memorial to all those who served with the Armed Forces of the United States in the Pacific area." The purpose of this Foundation is to create a living war memorial devoted to the advancement of knowledge through research and conservation.

5. *Field Stations*

THAT scientific research base stations be established in Hawaii and Guam to work in close co-operation with existing research organizations and institutions in these areas.

THAT subsidiary stations be established in the following categories:

a. Floating stations consisting of vessels equipped for specific fields of research.

b. Advance base stations for both marine and terrestrial research on various types of islands and at the extremes of environmental conditions available.

c. Liaison stations to promote, in co-operation with allied agencies, research in the following areas: the Solomon Islands, Australian New Guinea, French Oceania, Indonesia, the Philippines, and the Galapagos.

THAT steps be taken toward the establishment of a base research station for various types of scientific investigation in the Galapagos Islands, making use of existing installations. This base should be of a permanent nature because of the importance of maintaining continuous oceanographic, biological, and meteorological records from this island outpost of South America. By way of specific illustrations of projects for this station, it may be pointed out that various elements of the land fauna are little known; that the extraordinary humid zone of the south face of the larger islands offers the opportunity for a unique ecological mountain transect, especially from Academy Bay or Indefatigable Island; that the more barren coasts and islands afford simplified ecological conditions, comparable to those of Arctic islands, and provide a veritable field laboratory in themselves; and that the biological interest of these islands is so great that conservation measures, under the control of such a research station, are urgently required.

6. *Science Appraisal*

THAT a survey be made of the state of our knowledge in the various fields of science in the Pacific. The appraisal would have for its main object the compilation of a guide to what has been done in these fields, including a bibliography of the basic contributions. As a result of the survey, an investigator would know where further research in any field is most needed. The publication resulting from the appraisal would be a guide for investigators and administrators. In addition, the guide would help in two specific kinds of important undertaking:

a. Conservation measures to be agreed upon by international action.

b. Commercial policies to be evolved in progressive steps as international agreements are made necessary by problems of the use and distribution of natural resources.

7. *Documentation Centers*

THAT documentation centers be set up at Washington and at Honolulu, some of their functions to be:

a. Distribution of bibliographies on special fields.

b. Maintenance of a clearing house on current researches and projects.

c. Publication of a list of American and foreign scientists (with addresses) who have active interest in the Pacific. This list should be cross-referenced as to:

(1) The islands or ocean areas with which each scientist has had first-hand experience.

(2) The specific fields in which each scientist is most qualified to furnish coordinating information.

(3) The fields in which each scientist may have become an authority even though he may not have visited or worked in the area.

d. Establishment of an archive of publications, translations, and manuscripts dealing with Pacific researches.

8. *Internships*

THAT internships on Navy Survey vessels be provided for one or more scientists, under the supervision of an experienced scientist, to gather scientific information and collections from all areas in which these vessels may operate.

9. *Pacific Congress*

THAT the projected Pacific Science Survey encourage and assist in the organization of the Seventh Pacific Science Congress as soon as possible, in order to further co-ordination of research already in progress or being planned and to perfect arrangement for co-operation among countries of the Pacific Basin.

10. *Check Lists of Flora and Fauna*

THAT distribution check lists of the different

animal and plant groups in Oceania be prepared and published.

11. *Descriptive Geography of Micronesia*
THAT a Descriptive Geography of Micronesia be compiled, covering land forms, floral and faunal ecology, and human geography. Wherever possible, fullest use should be made of visual presentation of data, including aerial photographs that have already been taken by Army and Navy Air Forces.

12. *Scientific Appraisal at Bikini*
THAT means be provided for continuation of the appraisal of biological consequences of the atomic bomb tests at Bikini, over a period sufficiently long to cover the repopulation of the waters and lands with plant and animal life.

13. *Specific Scientific Recommendations*
THAT every assistance be given to the implementation of the specific recommendations for scientific research formulated at the conference in the fields of the anthropological sciences, the earth sciences, oceanography and meteorology, the plant sciences, public health and medicine, and the zoological sciences.

RECOMMENDATIONS PERTAINING TO INTERNATIONAL CO-OPERATION

1. THAT the Pacific Science Conference recognizes the urgency of international co-operation in scientific research and to that end recommends to the Congress of the United States that the Act of August 9, 1939, which authorizes the United States to co-operate with the American Republics in scientific undertakings of mutual interest, be amended to authorize such co-operation with all foreign countries.

2. THAT the governments of the countries of the Western Pacific be invited to consider the establishment of visitors' facilities at the principal centers where considerable research facilities for resident scientists already exist.

3. THAT a committee be appointed to investigate and recommend avenues of collaboration with the United Nations and other international organizations.

4. THAT the Pacific Science Conference urge the establishment, in co-operation with allied agencies, of liaison stations to promote research in the following areas: New Zealand, the Solomon Islands, Australian New Guinea, French Oceania, Indonesia, the Philippines, and the Galapagos.

5. THAT the proposed Pacific Science Survey:
   a. Collaborate with interested institutions and individuals, American and foreign, in the preparation of a series of regional floras. It is suggested that a beginning be made by drawing up plans for the publication of (1) a Flora of Micronesia and (2) a Flora of the Philippines, with a judicious amount of preliminary field work in both areas.
   b. Encourage field work looking toward publication of other regional floras in the Pacific and Oriental areas.

   THAT, to forward these objectives, requests from countries interested in securing American co-operation be welcomed in order to further the preparation of regional floras, which, in preliminary editions, may extend only to the genera.

   THAT field work be encouraged in those areas for which the data in hand are obviously inadequate, as, for example, the New Hebrides and the Solomon Islands.

6. THAT the Pacific Science Conference is highly gratified to learn of the establishment of the "Institut Francais d'Oceanie" and appreciates the opportunity afforded by the invitation of the French Government to American scientists to make use of the institute's facilities and to co-operate with French scientists in furthering knowledge of the Pacific area through a wide range of scientific research.

7. THAT encouragement be given (*a*) to the establishment by the government of the Netherlands Indies of a scientific research station at Hollandia, Dutch New Guinea, and (*b*) to the use of former Army installations for this purpose. The location of a scientific field station at Hollandia would greatly facilitate the scientific exploration of many parts of New Guinea. It is recommended that, if established, the station be provided with a small vessel suitable for coastwise operations and, if possible, plane facilities. American scientists would welcome an invitation to utilize the facilities of such a station and to co-operate with scientists working there.

8. THAT the survey of the algae and algal resources of Philippine and Indonesian waters, begun before the war by collaboration with Philippine and Dutch scientists and institutions, be continued and be extended to cover the Pacific by drawing into collaboration all agencies and persons willing to contribute toward this end. The food and fertilizer values of algae, and also their value as raw

materials in the preparation of commercial products, should be appraised.

9. THAT international correlation and standardization of nomenclature and of methods of measurement be established by international committees representing all nations working in the general Pacific area. (This relates particularly to land forms, rock and soil types, geological timetables, etc.)
10. THAT the Pacific Science Conference go on record as expressing its recognition of the urgent need for support in the rehabilitation of scientific libraries and scientific collections destroyed during the war.
11. THAT in the Philippines a scientific center supported by private funds be established as an aid to scientific work and studies. Such a center should co-ordinate its activities with existing government bureaus and institutions.

SPECIFIC RECOMMENDATIONS

A co-ordinated program of scientific research for the Pacific Islands (under American or foreign administration) has been formulated. Recommendations are as follows:

I. *DIVISION OF ANTHROPOLOGICAL SCIENCES.*

General preamble. It is recommended that this Conference, in collaboration with local inhabitants, encourage investigation of problems concerning the welfare of the people of the Pacific Islands.

A. *General studies* that should be stressed include:
   1. A comprehensive anthropological survey, covering each of the major divisions of the subject, priority to be given to an ethnographic study of Micronesia.
   2. Human geography.
   3. A survey of Micronesian linguistics and the establishment of standards of phonetic transcription, with the publication of textbooks of native languages.
   4. A survey of the social, economic, and political structure of the present-day cultures of Micronesia.
   5. Intensive study of the effects upon Micronesian societies of non-indigenous contact, such as Spanish, German, Japanese, and American culture, as well as of alien civil administration.
   6. Survey of Micronesian nutrition, diet, dietary therapeutics, food habits, and production and preparation of food.

B. *Specific studies* that should be initiated as soon as possible include:
   1. A physical anthropological survey of the Micronesians.
   2. Problems arising from increase and decrease of population.
   3. Child growth and development.
   4. Race mixture.
   5. Land utilization in Micronesia, to be studied with a view to determining those areas best suited for indigenous food crops and those best suited for commercial crops.
   6. Systems of land tenure, fishing rights, and property concepts in Micronesian cultures.
   7. Cultural conditioning (including the effects of the school system) of the child from infancy to maturity, to be studied in significant Pacific areas by anthropologists, psychologists, and educators.
   8. Native trade, and methods of developing natural resources.

II. *DIVISION OF EARTH SCIENCES.*

A. *Scope.* The Earth Sciences as herein defined include Physical Geography, Geology, and Geophysics.

B. *Regions of interest.* It is recommended that this Conference encourage a research program in the Earth Sciences for the entire Pacific Basin, with particular emphasis on Micronesia.

C. *Recommended Investigations.*
   1. *Geology.* Systematic geological surveys and areal geological mapping of selected key islands and, later, of island groups in the Pacific as a basis for scientific researches in paleontology, stratigraphy, petrology, and physiography; terrain studies and engineering-geologic interpretations of water supplies, construction materials, foundation conditions, mineral resources, and soil types.
   2. *Soil Science.* Reconnaissance soil surveys of the whole Pacific area and detailed soil surveys of regions of agricultural importance, including research through field stations and field working parties for each of the principal soil types as to:
      a. Genetic formation in relation to environment.
      b. Mechanical properties in relation to engineering needs.
      c. Crop adaptability and response to irrigation and fertilization in relation to production, nutrition, conservation, flood control, and land use.
   3. *Agricultural Committee.* Appointment of a Committee or Division on Agriculture under the Pacific Science Survey, to assist administrators of islands in the coordination of action programs designed (*a*) to increase food production and im-

prove efficiency in growing all agricultural and forest products, whether intended as food or as industrial raw materials for local industries and for commerce, and (*b*) to conserve soils, waters, and forests.

4. *Gravity Investigations.* Gravity observations at several atolls and at selected points about the shores of the lands and islands of the Pacific. It is recommended that a U. S. Navy submarine, using Vening-Meinesz pendulum apparatus, be employed for one year to make gravity observations at sea, particularly in the vicinity of the Aleutian trench and other trenches. These observations are intended to increase knowledge of geological structure, of seismological conditions, and of deflections of the vertical.
5. *Precise Position Determinations.* Employment of all possible means to improve the quality of basic astronomic position determinations and extend first-order triangulation when feasible, in order to obtain better basic geographic positions for airports and for Loran and other navigational installations and for general aerial mapping.
6. *Seismology.* Establishment and permanent maintenance of four additional seismological stations containing modern seismographs at selected points in the western Pacific, to improve the science of locating and studying Pacific area earthquakes, to increase knowledge of the geologic structure of the area, to study the relations between earthquakes and seismic sea waves, and to evaluate earthquake and seismic hazards.
7. *Microseisms.* Additional study of extratropical meteorological disturbances in the north Pacific and Alaska area, through extending to the Aleutian Island area the observation and study of microseisms and their relation to meteorology.
8. *Seismic Prospecting.* Promotion of seismic prospecting work about the submarine trench areas and at selected points about the shores and in the depths of the Pacific, for determination of sediment depths and of underlying rock structure.
9. *Structure of Atolls.* Investigation of the structure of typical atolls, including submerged, atoll-like structures, by seismic prospecting and core drilling, magnetometer prospecting, gravitational prospecting, and detailed bathymetric surveys of their flanks and approaches.
10. *Volcanology.* Descriptive geological and geophysical observations of various types at a number of active volcanoes, particularly any volcano showing unusual activity. Modern seismic, gravimetric, electric, and magnetometric techniques should be applied to the determination of underground structure in volcanic regions.
11. *Physics of the Ionosphere and Troposphere.* Investigation of atmospheric factors influencing the propagation of electromagnetic radiation at all frequencies, in relation to radio communication and geomagnetism and to telemetering and tracking at extreme altitudes.
12. *Geomagnetism.* Establishment and maintenance of permanent magnetic observatories in the Aleutians, in the Philippines, at Samoa, and at Christmas Island or Jarvis Island, for continuous recording of magnetic variations; employment of two field magnetometer parties for one year to investigate magnetic conditions at islands and along the shores of the Pacific, and complete repetition of such investigation after an interval of five years.

    Suitable airborne magnetic instruments should be utilized and further improved as necessary for investigations generally over the Pacific Ocean area, and two planes so equipped should be employed for one year in general magnetic work. These studies are designed to improve nautical and aeronautical charts, to investigate magnetic anomalies as related to geologic structure and volcanism, and to achieve other scientific results.
13. *Hydrology.* Investigation of infiltration of rainfall, stream flow and run-off, and flood hazards, and preparation of isohyetal maps; investigation of storage and diversion for irrigation and hydroelectric power development, and of ground water resources; and research in dynamics of erosion.
14. *Mineral Industries.* Initiation of prospecting operations to evaluate the importance of mineral deposits in the local economy, as the information on these deposits becomes available from geological studies.
15. *Mapping Activities.* It is recommended that hydrographic, topographic, geophysical, and submarine contour mapping be supported and correlated.
16. *Geologic Timetable.* Gradual establishment of a standard stratigraphic sequence of geologic formations in the Pacific. In order to understand the succession of geologic events in the area, a geologic timetable correlating the rock formations of the islands with those of the surrounding mainlands is essential.

III. *DIVISION OF OCEANOGRAPHY AND METEOROLOGY.*

The Division recommends:

A. THAT the United States immediately initiate preparations for a comprehensive program of investigations in the marine sciences in the Pacific area and that the following topics be a part of the general program of investigation.
   1. *Currents.*
      a. The vertical, horizontal, and seasonal distribution of tidal and non-tidal currents.
   2. *Interrelations of Sea and Atmosphere.*
      a. Data on waves: height, length, and period, including frequency and direction of waves of different magnitudes by months.
      b. Heat exchange with atmosphere.
      c. Water exchange with atmosphere.
   3. *Distribution of Physical Properties.*
      a. Complete survey, by areas and seasons, of temperature and salinity in the ocean, the variability of these characteristics, and the factors affecting this variability.
      b. Transparency of sea water and how it is affected by seasonal variations in coastal waters.
   4. *Distribution of Chemical Properties.*
   5. *Characteristics of Sea Bottom.*
      a. Composition, firmness, color, and geological character of bottom sediments, in offshore areas, channels, and harbor mouths.
      b. Beaches and wave zone, including trafficability characteristics of beaches and shallow water (hardness, cohesiveness, mechanical composition, and bearing capacity).
      c. Harbor and coastal silting and erosion resulting from waves and currents.

B. THAT the co-operative tidal program now in operation by the Coast and Geodetic Survey be continued and expanded in the western Pacific until observations are obtained over a sufficient period of time for a satisfactory analysis of the Pacific tides.

C. THAT support be given to the maintenance and expansion of the network of meteorological surface and upper-air stations in the Pacific area, including weather reconnaissance squadrons and special stations set up for the purpose of observing sferics, microseisms, sea swell, and radar as these relate to weather. The program would include:
   1. Study of medium and high altitude meteorology (above 5,000 feet), particularly of the northern and western areas.
   2. Basic theoretical work on the cause and maintenance of fog and a synoptic and geographic study of the distribution of fog in the North Pacific.
   3. Study of the thermal, moisture, and wind micro-structure of the lower layer of atmosphere (less than 5,000 feet).
   4. Research in formation, structure, and motion of typhoons.
   5. Study of meteorological conditions causing anomalous propagation of ultra-high-frequency radio and radar in the western Pacific area.

D. THAT support be given to the establishment of an office to supply information regarding locations of meteorological stations and available meteorological observations, and to furnish meteorological advice to agencies or individuals planning scientific research projects in the Pacific area.

E. THAT, if expeditions are organized in the Pacific area, provision be made for taking detailed sea-surface, meteorological, and radiation observations that are necessary to investigate the energy exchange between ocean and atmosphere and to study other problems.

F. THAT, since the already available data from the Pacific area must be thoroughly studied, analyzed, and evaluated before a comprehensive and well-integrated program in oceanography (marine sciences) can be decided upon:
   1. An office be established under the National Research Council to study, analyze, and evaluate the data and make the results available to the planning group.
   2. This office be adequately staffed by a head scientist and necessary clerical and technical assistants.

G. THAT, because of the different requirements in the various areas and in the several fields of science, four vessels be procured, equipped, and operated for general investigations on the high seas and that eight vessels be procured, equipped, and operated for regional investigations. One of the four large vessels and the eight smaller vessels should be used primarily for research in the natural resources of the sea and, in addition, should be equipped to participate in general oceanographic studies conducted by means of the other three large ships.

IV. *DIVISION OF PLANT SCIENCES.*

A. WHEREAS there has been a lack of correlation among the botanical endeavors of scientists of different countries, and

WHEREAS the most rapid progress and scientific co-operation among these countries in the study of botanical problems of the Pa-

cific will be brought about by personal contacts,

Be it resolved that botanical missions be sent to Japan, China (especially Formosa), and Korea (1) to obtain specimens, photographs of type and other important specimens, publications, translations of publications, and manuscripts, (2) to ascertain the needs of Pacific and Oriental botanists for corresponding scientific materials from America, and (3) to arrange for co-operation among the scientists of the participating countries.

B. WHEREAS ethnobotanical investigations are frequently neglected by both botanists and anthropologists, and

WHEREAS the field of ethnobotany is one in which much useful research may be done by workers in other fields,

Be it resolved that the National Research Council recommend methods of securing comparable linguistic terminology on economic botany and primitive agriculture from the boundaries of India through Polynesia.

C. WHEREAS the experiment station of the South Seas Bureau of the Japanese Government at Kolonia, Ponape, has a large collection of economic plants, two large modern buildings, and many acres of tillable land, and

WHEREAS both wet land and well-drained land have been under active cultivation, and the area is well suited for experiment station work,

Be it resolved that agricultural experimentation be continued at this station.

D. WHEREAS the food production capacity of many Pacific Islands might be increased by judicious enrichment of the flora through plant introduction, and

WHEREAS many other products of utility might be made available to isolated peoples,

Be it resolved that measures be taken to introduce widely throughout the Pacific new, useful, disease-free plants (including forest trees), favoring those that may have two or more utilities, such as use for lumber, for food, for fiber, for tannin.

E. WHEREAS modern modes of transportation and increased contacts of the island groups of the Pacific with each other and with the continents are greatly increasing the danger of spread of plant diseases,

Be it resolved that, whenever possible, a survey of parasitic fungi and other disease-producing organisms be made a part of plant science projects sponsored in the Pacific area, and

Be it further resolved that every precaution be observed to prevent the spread of diseases and pests (including weeds). Increased attention should be given to quarantine regulations and renewed studies should be made of the efficacy of quarantine measures.

F. WHEREAS certain problems of marine biology are of practical significance in the operation of ships,

Be it resolved that the following studies be undertaken:

1. Biological study of the distribution and habits of marine fouling organisms.
2. Investigation of the distribution and causes of phosphorescent waters.
3. Survey of fouling in certain areas of importance to shipping in order to determine maximum depth of significant marine growth.
4. Survey in representative areas of the main marine growth forms, their seasons of attachment and rates of growth.
5. Distribution of kelp and other large algae.

V. *DIVISION OF PUBLIC HEALTH AND MEDICINE.*

The Division recommends: THAT co-operative studies be conducted by qualified workers in the field of medicine, together with workers in the allied sciences, as follows:

1. Problems of the Pacific that have been demonstrated to be of particular importance to "non-immune whites."
   - *a.* Diseases particularly prevalent in the Pacific and of major importance: dysenteries, malaria, hepatitis, dengue complex, and tropical dermatitis; also diseases of lesser but peculiar importance: scrub typhus, schistosomiasis, filariasis, and Japanese B encephalitis.
   - *b.* Dissemination and implantation of disease, with particular reference to quarantine procedures.
   - *c.* Possible deleterious effects of the widespread use of DDT.
   - *d.* Utilization of special opportunities that may arise in the study of respiratory diseases.
   - *e.* Determination of factors that have led to the absence of arteriosclerosis and hypertension, which are presumed to be largely or entirely absent in certain native population groups of the Pacific.
   - *f.* Nutritional problems that arise from residence in the tropics.

2. Problems that have been demonstrated to be of particular importance to native populations.
   a. Diseases of special importance to natives, such as tuberculosis, yaws, malaria, leprosy, and helminthiases.
   b. Medical education for native doctors and nurses of the area.
   c. Feasibility of instituting modern public health procedures in certain native groups.
   d. Native nutrition.

VI. *DIVISION OF ZOOLOGICAL SCIENCES.*

General preamble. It is proposed that this conference aid and stimulate a broad basic program of zoological collecting in, and a study of, the land and water areas that fall within its scope. To this end it is recommended:

1. THAT a "clearing house" be established to assemble data on unstudied scientific materials from the Pacific; that such materials and specimens be located and listed as to scope, place, time of collection, and collector; that such information be made available to all interested scientists; that staff and funds be secured for the organization, study, and identification of existing Pacific collections and for the preparation of reports, such staff and funds to be used to strengthen the appropriate departments of existing institutions.
2. THAT special attention be given to the survey of the fish life of the Pacific, including:
   a. Preparation of a bibliography of the entire Indo-Pacific fauna.
   b. Collection of specimens in all parts of Oceania.
   c. Revisions of the fauna, group by group, at several institutions.
   d. Preparation and publication of a check list and successive revisions.
3. THAT the governments of the Philippines, of Canada, of the United States (especially in the Territory of Hawaii and the States of Washington, Oregon, and California), and other countries concerned, be encouraged to:
   a. Undertake a thorough, closely integrated investigation of the tuna-like fishes of the tropical Pacific.
   b. Co-ordinate their research with the needs of the industry.
4. THAT researches be conducted on the reef and lagoon fisheries of the Micronesian Islands and that the products of these fisheries be allocated for native use.
5. THAT a vessel and crew be furnished to facilitate a survey of the fishes and mollusks of the Carolines.
6. THAT advanced studies of evolution be supported by the establishment of adequate laboratory facilities in the Hawaiian Islands, where advantage can be taken of the unique development of *Drosophila* and of other animals and plants in that area, which may yield data of utmost importance bearing on the evolution of living organisms.
7. THAT the zoological survey of the Pacific area be implemented by the provision of funds for permanent staff and visiting fellows to utilize the facilities of the biological stations proposed.
8. THAT the zoological work of shore and floating biological stations relating to the marine fauna be co-ordinated with biological oceanographic work undertaken as part of the total survey of the Pacific envisaged.
9. THAT investigations in animal husbandry in the Pacific region be undertaken to cover:
   a. Determination of existing livestock populations, including adaptabilities.
   b. Possible improvement of livestock production by the use of better adapted breeds and improved species, such as Indian cattle.
   c. Study of existing livestock diseases and parasites on the islands.
10. THAT early and continued attention be given to the following biological problems:
    a.[1] Comprehensive investigations of the zooplankton.
    b.[1] Determination of causes and seasonal variation of phosphorescent waters.
    c.[1] Analysis of the character and prevalence of background noises of animal origin. This will involve studies of (1) sound production, and (2) geographical and seasonal distribution of sound-producing animals and their ecological relationships.
    d. Regional studies on the biology of fouling and boring organisms.
    e. Researches on the biology of reef-building corals, with particular reference to composition of populations and to growth rates in different areas.
    f. Ecological studies of poisonous and otherwise dangerous animals.
    g. Ecological studies of termites.
    h. Survey of the populations and major breeding grounds of the larger marine birds.

[1] This should be correlated with other researches and programs in physical oceanography and fisheries biology.